CLAIMS

1. A semiconductor laser in which an n-type semiconductor layer, an active layer, and a p-type semiconductor layer are stacked in this order on a substrate;

the active layer comprising a well layer composed of InGaN;

the semiconductor laser comprising an intermediate layer sandwiched between the active layer and the p-type semiconductor layer; and the intermediate layer including no intentionally added impurities and being composed of a gallium nitride-based compound semiconductor.

2. A semiconductor laser according to claim 1, wherein the thickness of the intermediate layer is not less than 15 nm and not more than 180 nm.

3. A semiconductor laser according to claim 2, wherein the semiconductor laser is a Group III-V nitride semiconductor laser, the n-type semiconductor layer contains Si as an n-type impurity, and the p-type semiconductor layer contains Mg as a p-type impurity.

4. A semiconductor laser according to claim 1, wherein the concentration of the p-type impurity in the active layer is about 1E17 cm^{-3} or lower.

5. A process for manufacturing a semiconductor laser, comprising the steps of:

forming on a substrate an n-type semiconductor layer doped with an n-type impurity;

forming on the n-type semiconductor layer an active layer comprising a well layer composed of InGaN;

forming on the active layer an intermediate layer composed of a gallium nitride-based compound; and

forming on the intermediate layer a p-type semiconductor layer doped with a p-type impurity, wherein the intermediate layer is formed without being doped with any impurities.

6. A semiconductor laser in which an n-type semiconductor layer, an active layer, and a p-type semiconductor layer are stacked in this order on a substrate;

the semiconductor laser comprising an intermediate layer sandwiched between the active layer and the p-type semiconductor layer and composed of a gallium nitride-based compound semiconductor;

the intermediate layer having a stacked structure comprising an undoped layer including no intentionally added impurities and a diffusion-blocking layer doped with an n-type impurity; and the diffusion-blocking layer being located at a side adjacent to the p-type semiconductor layer.

7. A semiconductor laser according to claim 6,

wherein the concentration of the n-type impurity in the diffusion-blocking layer is about the same or higher than that of the p-type impurity in the p-type semiconductor layer.

8. A semiconductor laser according to claim 6, wherein the concentration of the n-type impurity in the diffusion-blocking layer is not less than 1E19 cm^{-3} and not more than 6E19 cm^{-3}.

9. A semiconductor laser according to claim 8, wherein the semiconductor laser is a Group III-V nitride semiconductor laser, the n-type semiconductor layer contains Si as an n-type impurity, and the p-type semiconductor layer contains Mg as a p-type impurity.

10. A semiconductor laser according to claim 6, wherein, assuming that the thickness of the undoped layer is 1, the thickness of the diffusion-blocking layer is not less than 1/11 and not more than 11.

11. A semiconductor laser according to claim 10, wherein the thickness of the intermediate layer is not less than 15 nm and not more than 180 nm.

12. A semiconductor laser according to claim 6, wherein the active layer comprises a well layer composed of InGaN.

13. A process for manufacturing a semiconductor laser, comprising the steps of:

forming on a substrate an n-type semiconductor layer doped with an n-type impurity;

forming on the n-type semiconductor layer an active layer comprising a well layer composed of InGaN;

forming on the active layer an intermediate layer composed of a gallium nitride-based compound; and

forming on the intermediate layer a p-type semiconductor layer doped with a p-type impurity,

wherein the step of forming the intermediate layer comprises the steps of growing a gallium nitride-based compound semiconductor layer without adding any impurities, thereby forming an undoped layer including no intentionally added impurities, and starting to add an n-type impurity in the course of the growth of the gallium nitride-based compound semiconductor layer, thereby forming a diffusion-blocking layer.

14. A process for manufacturing the semiconductor laser according to claim 13, wherein the step of forming the n-type semiconductor layer on the substrate is performed after selectively growing a nitride-based compound semiconductor layer in the lateral direction on the substrate.